

Update of the Voluntary Accelerated Vehicle Retirement Regulation and Guidelines for the Voluntary Repair of Vehicle Program

Goals:

- Modify the voluntary accelerated vehicle retirement (VAVR) regulation to allow the optional use of remote sensing (RSD) or other technologies/approaches to identify high emitting¹ vehicles (HEVs) and solicit the owner's participation in a VAVR program.
- Include a methodology to calculate the extra emission reduction credit for voluntarily retired HEVs.
- Develop new guidelines governing voluntary repair of vehicle (VRV) programs.

Approach:

ARB staff is proposing changes to the VAVR regulation and additional guidance governing VAVR programs. The regulation would specify the technologies/approaches that may be used to identify HEVs. Staff is proposing to allow the use of RSD, high emitter profiles (HEP), or other technologies/approaches approved by the ARB. The regulation would specify the criteria for setting up and operating a VAVR program which identifies HEVs for possible voluntary retirement.

ARB staff is proposing that the methodology for calculating emission reductions for retiring HEVs would be added to the Carl Moyer Program Guidelines, not the regulation. This would provide flexibility to modify the methodology as high emitter VAVR programs evolve. Revising the methodology through changes to Carl Moyer Program Guidelines, without having to reopen the regulation, would allow the ARB to incorporate changes more quickly. The Carl Moyer Program Guidelines are revised on a biennial basis providing a mechanism to incorporate changes.

ARB staff is also proposing Carl Moyer Program Guidelines governing VRV programs as an additional option for reducing emissions from HEVs.

This document provides ARB staff concepts for the updated VAVR regulation and Carl Moyer Program guidance, consisting of three parts, to be discussed at the June 29, 2006 workshop:

1. Identification of HEVs for Participation in VAVR Programs – Proposed Revisions to the VAVR Regulation
2. Calculating Emission Reductions for HEVs – Proposed Additions to Carl Moyer Program Guidelines
3. VRV Programs – Proposed Additions to Carl Moyer Program Guidelines

¹ For purposes of this regulation, "high emitting vehicle" or HEV refers to a vehicle identified between biennial Smog Checks that would fail its next Smog Check.

Identification of HEVs for Participation in VAVR Programs Proposed Revisions to the VAVR Regulation

- ARB staff is proposing to allow air districts the option of using RSD or other technologies/approaches to identify HEVs between their biennial Smog Checks and to solicit owners of the HEVs to voluntarily participate in VAVR programs to generate extra emission reduction credit. Districts may still administer VAVR programs that do not identify HEVs to generate extra emission reduction credits.
- High Emitting Vehicle or HEV is defined in reference to the Bureau of Automotive Repair (BAR) Acceleration Simulation Mode (ASM) pass/fail emission standard (Title 16, Division 33, Chapter 1, Article 5.5, Section 3340.42 of the California Code of Regulations), specifically:

Any vehicle whose emissions exceed emission limits calculated using the ASM pass/fail emission standard for the model year and vehicle class is considered a high emitting vehicle or HEV and is potentially eligible to generate extra emission reductions if qualified and voluntarily retired.
- Each district that intends to administer a high emitter VAVR program must submit a VAVR project plan to the ARB that clearly shows that the program will be administered in compliance with the letter and intent of the VAVR regulation.
- Before an air district initiates a VAVR program that generates extra emission reduction credits, the VAVR project plan must be approved in writing by the Executive Officer of the ARB.
- The VAVR project plan must
 - Clearly describe the operation and application of the technology/approach that will be used to identify potential HEVs and include the methods of maintenance and calibration, if required, for that technology/approach.
 - Include a copy of the technology's standard operating procedures.
 - For programs that use RSD to identify HEVs, the plan must include but is not limited to the following:
 - The methodology for selecting site locations for RSD equipment
 - The criteria for determining valid RSD measurements (such as Vehicle Specific Power range, etc.)
 - The number of valid RSD readings needed to identify a potential HEV
 - Specify the criteria that would be used to identify a vehicle as a potential HEV to be contacted for voluntary participation.
 - For RSD-based programs, this could be specific RSD cut points, a certain percentage of vehicles (e.g. the highest 1 or 2 percent of RSD measurements), or other parameters.

- Estimate of number of vehicles to be retired and the resulting emission reductions, calculated in accordance with ARB guidelines on calculating emission reductions for voluntary retirement of HEVs.
- The regulation will specify the ARB's criteria for evaluating the air district's VAVR plan and the main elements for the VAVR plan.
- The Carl Moyer Program Guidelines will provide the recommended methodology for estimating extra emission reductions credits from retiring HEVs. Districts must follow the methodology unless they receive approval from the ARB to use an alternative.
- The technology used to identify HEVs must be operated, maintained, and calibrated in accordance with the manufacturer's recommendations. Any deviation from the standard protocol should be detailed in the air district VAVR plan.
- The use of RSD is currently limited to that of a screening tool where at least two RSD measurements are required to be taken to identify a potential HEV. The two RSD measurements may be sequential (i.e. dual head units) or spaced by a greater time span at the district's discretion.
- The owners of vehicles identified as potential HEVs should be contacted as soon as possible. ARB staff is proposing that the time span between an RSD measurement and sending a letter to the owner of a potential HEV soliciting them to participate in a VAVR program should be no more than 30 days.
- ARB staff is not proposing to specify an RSD cut point in the regulation. Instead, the air district plan must specify the criteria that would be used to identify a vehicle as a potential HEV to be contacted for voluntary participation. This may be specific RSD cut points, a certain percentage of vehicles (e.g. the top 1 or 2 percent of RSD measurements), past Smog Check history, or other parameters.
- For VAVR programs that identify potential HEVs for extra emission reduction credits, the district shall maintain and store the following information for each HEV retired (in addition to the recordkeeping already required in Section 2609 of the VAVR regulation):
 - For any technology/approach used to identify a potential HEV
 - A description of the technology/approach used to identify a potential HEV
 - The criteria used to identify a potential HEV
 - The number of potential HEV owners contacted
 - The ASM measurements used to verify that the vehicle is an HEV
 - The date of the ASM test
 - For RSD-based programs:
 - The RSD measurements for each vehicle
 - The date of the RSD measurements

Calculating Emission Reductions for HEVs Proposed Additions to Carl Moyer Program Guidelines

- ARB staff proposes using RSD measurements, high emitter profiles, or equivalent technologies/approaches as screening tools to identify HEVs for participation in VAVR programs. Emission reduction estimates would not be based on the RSD measurement. Instead, reductions would be based on confirmatory ASM tests identical to those used in BAR's Smog Check program to establish the emissions of the vehicle being retired.
- To be eligible to receive extra emission reduction credit, an identified vehicle's confirmatory ASM test would need to exceed the pass/fail emission standard for the for the model year and vehicle class as defined in Title 16, Division 33, Chapter 1, Article 5.5, Section 3340.42 of the California Code of Regulations.
- Vehicles whose emissions are below the pass/fail emission standard would not be considered an HEV and would not be eligible for extra emission reductions. These vehicles could still be voluntarily retired and receive the default emission reductions already established in the existing VAVR regulations
- ARB staff proposes using the same fundamental approach as in the current regulation described in the 1998 VAVR regulation staff report (<http://www.arb.ca.gov/regact/scrap/isor.pdf>) to estimate the reductions of retiring high emitting vehicles. However, the variables would be different. That is, the equations for calculating emission reductions would be:

Exhaust Emissions

$$\text{Emission Reductions}_{\text{exh}} = [\text{ER}_{\text{retired}} * \text{VMT}_{\text{retired}} - \text{ER}_{\text{replacement}} * \text{VMT}_{\text{replacement}}] * \text{Life}_{\text{retired}}$$

Where:

- $\text{ER}_{\text{retired}}$ = Emission rate of retired vehicle
- $\text{VMT}_{\text{retired}}$ = Vehicle miles traveled of retired vehicle
- $\text{ER}_{\text{replacement}}$ = Emission rate of replacement vehicle
- $\text{VMT}_{\text{replacement}}$ = Vehicle miles traveled of replacement vehicle
- $\text{Life}_{\text{retired}}$ = The remaining life of the retired vehicle

For ROG_{exh} , NOx , and CO , each of these variable would be calculated as follows:

$\text{ER}_{\text{retired}}$:

Unlike the methodology in the existing regulation which assumes retired vehicles pass Smog Check, high emitting vehicles identified off-cycle would presumably fail their next Smog Check. Consequently, the emission rate of the retired vehicle would change over the credit life. It would be higher before the vehicle's next biennial Smog Check, but after the Smog Check, its emissions would be lower because it would have had to be repaired in order to stay on the road. To estimate the retired vehicle's emissions, we must estimate:

- Emission rate until the next Smog Check
- Emission rate after the next Smog Check
- Length of time until next Smog Check

ARB staff proposes the following approach to estimate each of these:

Emission rate until the next Smog Check: Because all candidate vehicles would be required to have a Smog Check ASM test after being identified as a potential HEV, ARB staff proposes that the emission rate until the next Smog Check be equal to the measured Smog Check ASM reading converted to a federal test procedure (FTP) based gram per mile emission rate using the conversion equations developed by Eastern Research Group and Sierra Research and used in ARB and BAR's *2004 Evaluation of the California Enhanced Inspection and Maintenance (Smog Check) Program*.

For vehicles exempt from Smog Check (pre-1976 model years), this emission rate would be used for the entire credit life because these vehicles would not have been required to pass a future Smog Check.

Emissions after the next Smog Check: ARB staff is considering several approaches, but does not have a proposal at this time.

1. Assume emission rates are equal to the Smog Check ASM cutpoint.
2. Assume emissions are equal to the model year average, as in current regulation.
3. Assume something in between 1 and 2, that is, emissions are below the ASM cutpoint but above model year average.

Approach 1 may overestimate emission rates after repair because vehicles are generally repaired to levels below the ASM cutpoint. On the other hand, while emissions immediately after the repair are most likely below the ASM cutpoint, this approach may account for the deterioration that happens after repairs, so over years 2 and 3 of the credit, this may produce a reasonable estimate.

Approach 2 may underestimate emission rates because roadside data evaluated in the *2004 Evaluation of the California Enhanced Inspection and Maintenance (Smog Check) Program* showed that vehicles that failed an initial Smog Check and were subsequently repaired had higher average emission rates than those that passed an initial Smog Check.

Length of time until next Smog Check: Because vehicles are, on average, one year away from their next biennial Smog Check, ARB staff proposes to assume all vehicles are one year away from their next Smog Check for simplicity. This may overestimate the time for some vehicles and underestimated it for others, but should be correct on average.

An alternative would be to use the actual time between the retirement date and the next required Smog Check for each vehicle. This would be more precise for each vehicle than the approach being proposing but would add complexity.

VMT_{retired} :

ARB staff proposes using the average VMT of the model year vehicle retired, as is the case in the current regulation. Staff considered the alternative of estimating an individual vehicle's VMT based on the difference in odometer reading between its last two Smog Checks. This approach was suggested when the VAVR regulation was last updated in 2002. At that time, ARB staff concluded that the Smog Check odometer data were not sufficiently reliable because a portion of these data are inaccurate (for example, odometer readings that are less than the odometer reading at a previous Smog Check).

ER_{replacement} :

The current VAVR regulation does not require that owners document how they replace the vehicles they retire. ARB staff does not plan to change this. However, some air districts have expressed interest in providing additional incentives for owners that document that they have purchased a vehicle certified to ARB's low emission vehicle (LEV) or cleaner emission standard. ARB staff proposes allowing this option in the emission reduction calculation guidance.

Case 1 – No requirement for replacement vehicle: The replacement vehicle emissions equals fleet average emission rate, as in the current regulation.

Case 2 – Provide extra incentives if a LEV-certified or cleaner replacement vehicle is purchased: If the owner documents that the replacement vehicle is certified to a LEV or cleaner emission standard as defined in the ARB's LEV regulations (Title 13, Division 3, Chapter 1, Article 1, Sections 1960.1 and 1961 of the California Code of Regulations), ARB proposes that ER_{replacement} equal the emission rate of a 8 year old LEV-certified vehicle in the EMFAC model (exhaust technology group 23 in the EMFAC model).

An alternative would be using the actual model year of the replacement vehicle.

Because this is not currently an option in VAVR programs, data are not available to use in predicting the age of replacement LEV-certified vehicles. ARB staff assumes that replacement vehicles would be older model year LEV-certified vehicles based on the level of incentives to be provided. Because LEV-certified vehicles only became available in the late 1990s, we assume replacement vehicles would come mainly from the 1997-2001 model years (6-10 year old vehicles in calendar year 2007, or 8 years old on average). Once data become available from actual VAVR programs which provide extra incentives for the purchase of LEV-certified replacement vehicles, ARB staff would evaluate these data and update its estimate if necessary in future versions of guidance.

VMT_{replacement} :

ARB staff proposes that the VMT of replacement vehicle would be equivalent to the VMT of the retired vehicle, as is the case in the existing regulation.

Life_{retired} :

ARB staff proposes that the life of the retired vehicle be three years, as is the case in the existing regulation.

Surveys conducted since the regulation was adopted in 1998 support the three year credit life. These surveys conducted in the Bay Area and South Coast indicate that owners estimated their vehicles would have lasted on average 3-3.5 years if they had not been retired. The South Coast data is from the 1999 time frame. However, Bay Area survey data are available from as recently as 2004-2005. At this time, ARB staff does not have any data that would indicate the remaining life should be longer.

For PM:

ARB staff proposes that PM exhaust emission reductions be calculated using the default methodology described in the 1998 staff report for the VAVR regulation. The use of RSD to identify vehicles that are high emitting for PM has not been demonstrated. In addition, PM emissions are not measured in the Smog Check ASM test. There are currently not enough data to establish extra emission PM exhaust reduction credits.

ARB staff acknowledges that the South Coast Air Quality Management District plans to evaluate methods for identifying PM high emitters and quantifying PM emission reductions. If the South Coast District demonstrates a viable, technologically supportable method, ARB staff would support assigning extra PM emission reductions for the retirement of PM high emitters.

Evaporative emissions:

ARB staff proposes that evaporative emission reductions be calculated using the default methodology described in the 1998 staff report for the VAVR regulation. RSD does not measure evaporative emissions, and high emitter profiles do not predict likelihood of evaporative Smog Check failures. Consequently, the extra emission reduction credits for retiring high emitting vehicles would apply only to exhaust emissions.

ARB staff acknowledges that the South Coast District is considering conducting evaporative emission testing of vehicles identified as HEVs for exhaust via RSD. If these vehicles are found to have excessive evaporative emissions, they would be eligible for extra evaporative emission reduction credits if retired. ARB staff will work with South Coast District staff to develop a method for quantifying these evaporative emission reductions.

Voluntary Repair of Vehicles Proposed Additions to Carl Moyer Program Guidelines

With legislation signed into law in 2004 (AB 923), vehicle repair programs are now fundable under the Carl Moyer Program, and air districts have expressed interest in funding VRV identified as HEVs as an alternative to vehicle retirement.

ARB staff is proposing the following criteria for inclusion in the Carl Moyer Program Guidelines for VRV programs as an additional option for reducing emissions from HEVs.

Proposed Project Criteria

The proposed project criteria listed below provide air districts with the minimum qualifications for running VRV programs. The districts may choose to impose additional requirements to address local concerns.

A. Vehicle Eligibility

- Participation in the VRV program shall be entirely voluntary for vehicle owners.
- The program shall be complementary to BAR's Consumer Assistance Program (CAP) where only vehicles that are between their biennial Smog Checks or "off-cycle" to the Smog Check program are eligible for the VRV program. A vehicle that is within 90 days of the next scheduled Smog Check is not eligible.
- The vehicle must be a passenger car, light-duty truck, or medium-duty vehicle up to 8,500 pounds gross vehicle weight.
- The vehicle must have been registered in the district for at least 24 months prior to repair, and all Smog Checks must have been performed as required by the Department of Motor Vehicles (DMV) in order for the vehicle to be considered registered.
- The vehicle must be fully operational and shall be driven to the location of the repair.
- The vehicle must have been identified as a potential HEV through a technology/approach such as RSD or an HEP database approved by the ARB to be eligible for participation in a VRV program; i.e., no "walk ins" allowed.
- Prior to being repaired, a vehicle must receive a pre-repair ASM test to establish its baseline emissions. To be eligible to participate, a vehicle's ASM test must exceed the pass/fail emission standard for the model year and vehicle class as defined in Title 16, Division 33, Chapter 1, Article 5.5, Section 3340.42 of the California Code of Regulations. If the vehicle's pre-repair emissions are below the ASM pass/fail emission standards, the vehicle would not be considered an HEV and would not be eligible for a VRV program.

- A vehicle may only be repaired once in its lifetime using VRV funding.
- A district may establish additional qualification requirements for repair cost assistance such as consumer income eligibility restrictions, model year eligibility restrictions, or repair cost limits.

B. Repair Requirements

- Vehicles shall only be repaired by technicians currently licensed through the BAR.
- The repair of the vehicle must bring the vehicle's emissions into immediate compliance with the ASM emissions standards for the model year and vehicle class to be fundable, i.e., repairs that leave a vehicle's emissions greater than the ASM emissions standards are not fundable.
- Only emission related repairs are fundable through a VRV program.
- Any tampering of the vehicle's engine and/or emission controls related parts and performance must be completely corrected prior to entering the vehicle into a VRV program. No VRV funds may be used to correct cheating or tampering.
- If repairs involve replacing catalysts, the replacement catalyst must be OBD II compliant.
- The invoice for the repair must clearly detail each repair and associated cost before the invoice is paid.

C. Calculating Emission Reductions

- Emission benefits are calculated from the difference between the pre and post-repair ASM test where the post ASM test is a full ASM test, not a "Fast Pass" test.
- The pre and post repair ASM testing must be completed within 24 hours of the repair.
- The pollutant concentrations measured in the ASM test are converted to a federal test procedure (FTP) based g/mile emission rate using the conversion equations developed by Eastern Research Group and Sierra Research and used in the ARB and BAR's *2004 Evaluation of the California Enhanced Inspection and Maintenance (Smog Check) Program*.
- The vehicle miles traveled (VMT) are assumed to be the average VMT of the vehicle's model year based on the ARB's EMFAC emission model.
- The life of the emission credit is one year.

- The mass emission reduction is equal to the g/mile emission reduction multiplied by the VMT multiplied by the one year credit life.
- The repair of each individual vehicle under a VRV program must be cost-effective as defined by the latest version of the Carl Moyer Program Guidelines.

D. Reporting and Record Keeping

- The district shall retain detailed records of each vehicle repaired and shall summarize the transactions in an annual report to the ARB. The report shall contain but not be limited to:
 1. District and district contact name and number
 2. Make, model, and year of vehicle of each vehicle repaired
 3. Vehicle VIN and license number
 4. Name, address, and phone number of vehicle owner
 5. Name, address, and telephone number of the business conducting the repair
 6. Amount paid for repair and nature of repair
 7. Date of repair
 8. Data identifying vehicle as potential HEV for VRV participation (RSD readings, etc.)
 9. Pre and post ASM Test results
 10. Emission reductions claimed
 11. Verification that vehicle met registration requirement
 12. Date next scheduled Smog Check

E. VRV Program Plan

- A district shall submit a VRV program plan to the ARB for approval prior to initiating the program. If the VRV program is being run in coordination with a VAVR program, one program plan can be submitted covering both elements if the district chooses.
- The district must receive written approval of the plan from the ARB's Executive Officer prior to implementing a VRV program.
- A district's VRV program plan must at a minimum include:
 1. The name, title, and telephone number of the district contact for the VRV program.
 2. An evaluation of environmental justice considerations including, but not limited to, outreach addressing community needs.
 3. An estimate of the number of vehicles that may be repaired and an estimate of the cost-effectiveness of the program along with all assumptions and calculations that were used to derive the estimate (recognizing that the ultimate cost-effectiveness will depend on the mix of vehicles actually repaired).

4. A description of the technology/method (RSD, high emitter profile, etc.) that will be used to identify potential HEVs for participation.
 - For RSD-based programs, the plan must include a detailed protocol describing the installation, calibration, and operation of RSD that will be used to identify HEVs along with the methodology for processing of the data collected.
 5. A sample of the letter that the district intends to send to vehicle owners soliciting their voluntary participation in the project.
 6. A sample of the contract with the business(es) that will be performing the vehicle repairs.
 7. A description of the methods that will be used and a timetable for monitoring and auditing vehicle repair operations.
 8. The methodology for verifying that a vehicle is eligible for inclusion in the VRV program including confirmation of compliance with any Smog Check requirements.
 9. A sample of the records that will be required of the business(es) that will be performing the vehicle repairs.
 10. A description of elements of the district VRV program that are more stringent than those listed in the guidance (if a district chooses to impose requirements beyond those required).
 11. Any additional information necessary to explain or clarify how the district plan complies with the VRV guidance and the Carl Moyer Program.
 12. The plan shall include itemized, estimated project costs including, but not limited to, the funds allocated to vehicle repair and the number of vehicles to be repaired; the funds allocated to vehicle retirement and the number of vehicles to be retired; and the costs allocated to RSD data collection, data analysis, outreach, and solicitation of vehicle owners.
- The project must follow the plan, and any substantive changes must be pre-approved by the EO.

Additional VRV Questions for Stakeholder Consideration:

1. Staff proposes to limit a vehicle to one repair funded through a VRV program in its lifetime. Should the vehicle owner's participation in a VRV program be further limited (e.g, to once every 5 years) to avoid having the VRV being used as routine maintenance of an owner's fleet of vehicles, or should this decision be left to districts?
2. Should there be a model year limit on vehicle eligibility for a VRV program; i.e., vehicles more than 20 years old would only be eligible for VARV and not repair, and vehicles newer than 6 years old should not be repaired as these vehicles are not subject to Smog Check and should be repaired by the owners? Should this decision be left to districts?
3. Should the cost of repair be limited to a certain percentage (e.g., 50%, 75%) of the street value of the vehicle, or should this decision be left to districts?
4. Is there a way to ensure that a vehicle is not being repaired solely so that the owner can turn around and sell the vehicle?
5. Should the vehicle owner be required to spend a minimum co-payment on the repairs being funded by VRV in order to have "buy in" as is the case with BAR's CAP program, or should this decision be left to districts?
6. Should eligibility be restricted to personal vehicles, meaning commercial vehicles would be ineligible, or should this decision be left to districts?
7. Should emission benefits be allowed for the repair of evaporative emissions, and, if so, how are these emissions to be quantified?
8. Should emission benefits be allowed for the reduction of PM10, and, if so, how are these emissions to be quantified?
9. How should the repairs be paid for, i.e. direct payment to the consumer or to the repair technician, vouchers? Should this decision be left to districts?